

ITEM 573.1017NN11 - FIELD CLEANING AND PAINTING OF STEEL BRIDGE RAILING (WEATHERED GALVANIZED - NOT PREVIOUSLY PAINTED)

ITEM 573.1018NN11 - FIELD CLEANING AND PAINTING OF STEEL BRIDGE RAILING (PREVIOUSLY PAINTED)

DESCRIPTION

This work shall consist of pressure washing, abrasive blast cleaning to remove all paint, rust, millscale, and other corrosion producing contaminants, and painting of steel bridge railings with either three (3) or four (4) coats of new paint as indicated below and by the Contract Documents.

Steel bridge railing that exhibits a deteriorated paint system or as indicated by the Contract Documents shall be prepared by pressure washing, abrasive blasting and painting with three coats of paint. Steel bridge railing comprising of previously unpainted, weathered galvanized steel or as indicated by the Contract Documents shall be prepared by pressure washing and painting with four coats of paint.

MATERIALS

1. **Water for Washing.** Water for pressure washing shall be clean, fresh water. Cleaners, detergents, or other additives will not be allowed. Salt water will not be allowed. Water may be heated.
2. **Solvents for Cleaning.** Solvents used for the solvent cleaning operations should conform to those listed in SSPC SP-1 Solvent Cleaning specification.
3. **Abrasive for Blast Cleaning.** Abrasive material for blast cleaning may be selected by the Contractor. All abrasive shall be free of lead and corrosion producing contaminants. The abrasive selected for use shall be designed to leave a profile of approximately 40 μm to 65 μm in a dense, uniform pattern of depressions and ridges. Silica sand and other types of non-metallic abrasive containing more than 1.0% crystalline (free) silica, by weight, will not be allowed. If recyclable steel grit abrasive is used it shall be cleaned of all paint, chips, rust, millscale and other foreign material after each use, and prior to reuse. All equipment used for cleaning abrasive shall be specifically designed for this purpose, and approved by the Engineer.
4. **Paint and Thinner.**
Weathered Galvanized Railing - Not Previously Painted:
Paint and thinner shall be selected from the Department's Approved List of Paints - Moisture Cured Urethanes. No substitutions will be allowed.

Previously Painted Railing:
Paint and thinner shall be selected from the Department's Approved List of Paints For Structural Steel. An organic zinc paint system appearing on the latest NEPCOAT Qualified Products List, List B (<http://www.nepcoat.org/baresteelapr04.pdf>) may also be used.

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The color of the primer(s) and intermediate coat shall be the Contractor's option, and shall provide contrast with the underlying substrate. The color of the finish paint shall be as specified in the Contract Documents, or as ordered by the Engineer.

5. **Brushes and Rollers.** Brushes, rollers and other applicators used to apply paint shall be of a high quality and be of a type that is specified for the type of paint being used. The brushes, rollers or other applicators used shall not leave fibers in the paint film.
6. **Basis of Acceptance.** All coats of paint shall be accepted on the basis of the manufacturer's name, and the product name appearing on the Department's Approved List.

Water for pressure washing shall be approved by the Engineer.

Solvents for solvent cleaning shall be approved by the Engineer.

Brushes, rollers and other applicators shall be approved by the Engineer.

Only paint and thinner arriving at the work site in new, unopened containers shall be used.

Containers of paint shall be labeled with the manufacturer's name, product name, batch number and date of manufacture. Paint that has not been used within 12 months from the date of manufacture shall be removed from the work site.

CONSTRUCTION DETAILS

1. **Surface Preparation**

- a. **Pressure Washing.** (All Railings) All railing surfaces to be painted shall first be pressure washed using equipment operating at a minimum pressure of 21.5 MPa, and with a minimum flow rate of 9.5 L/minute. The pressure washer shall be operated at a distance of 150 mm to 300 mm from the surface. Water may be heated. After washing, the steel surface shall be allowed to dry before subsequent solvent cleaning or painting work is done.

Pressure washing shall be performed to remove all dirt, dust, animal waste, and water soluble contaminants. Clean, fresh water shall be used. Hand scraping and hand scrubbing with a stiff bristled brush will be required as necessary to remove debris.

After pressure washing, the cleaned surfaces shall be visually free of dust, dirt, oil and grease, animal waste, salts, and other debris.

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Pressure washing will only be allowed when ambient air temperatures are greater than 4.5°C and rising. In no case shall pressure washing be performed when in the opinion of the Engineer spent wastewater will freeze on roadway or bridge surfaces, or in any other way create a hazardous situation.

When necessary, containment shall be provided to prevent spray and residue from falling on or interfering with traffic, pedestrians, or surrounding property, above or below the structure. Extreme care shall be exercised to ensure that vehicles, pedestrians, and property are not exposed to the cleaning process.

All structures over water courses shall be washed during the seasonal periods indicated in the Contract Documents. If no schedule is provided, washing shall occur only when adequate flow in the stream exists to dilute possible contaminants. Operations shall be sequenced so as to clean structures over small bodies of water or small streams in the spring of the year, or in a period when flows are greatest. Streams categorized by the Department of Environmental Conservation (DEC) as "CT(s)", i.e. trout spawning, shall be washed prior to July 1 and bridges located at DEC yearling trout stocking sites shall not be washed during April. When washing operations are performed on bridges over a public water supply, e.g., reservoir or on bridges in the watershed area of the New York City water supply, the spent washwater shall be diverted, or collected, and disposed of on the adjoining land mass, at a location away from the waters edge.

To minimize contamination of the washed surfaces, the washed surfaces should be solvent cleaned and painted within 3 days after completion of washing work. If more than 3 days pass by, or if the railing surfaces become dirty, they shall be rewashed and solvent cleaned in accordance with this specification, at no additional cost to the State.

- b. Solvent Cleaning (*ALL RAILINGS*). Areas of the steel railing demonstrating grease or oil stains or other staining not removed by pressure washing shall be solvent cleaned according to SSPC SP-1 Solvent Cleaning.
- c. Commercial Blast Cleaning (*PREVIOUSLY PAINTED RAIL ONLY*)

All surfaces of the previously-painted steel rail shall have all paint, rust and rust scale, mill scale, and other corrosion producing contaminants removed by abrasive blast cleaning to bare metal in accordance with SSPC-SP 10, Near White Metal Blast Cleaning.

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Steel surfaces that have been cleaned to SP-10 shall be accepted by visual comparison to a project prepared standard(s) for each structure. The Contractor shall prepare a project standard by abrasive blast cleaning a representative area on the structure that is being prepared for painting. The prepared standard shall generally conform to SSPC VIS 02-12, "Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning", Condition Photographs A SP 10, B SP 10, C SP 10, D SP 10, G₁ SP 10, G₂ SP 10, G₃ SP 10, as applicable based on initial condition, and shall be approved by the Engineer before the start of general cleaning work. Though the reference photographs are used for judging general conformance to SP-10, they shall not be used as a substitute for the written SP-10 standard.

At least one standard shall be prepared for each structure whose steel bridge railing is being specified for cleaning. More than one standard may be necessary if the cleaned steel differs significantly from the photographic standards due to surface conditions or other factors. Each standard shall be at least 300 mm x 300 mm in size, and shall be located in an area of the structure that is accessible to, and approved by the Engineer. If the geometry of the railing does not accommodate a standard this size, then a size as deemed acceptable by the Engineer shall be established. The Contractor shall protect the work standard from corrosion and contamination throughout the duration of work by applying a clear coat of polyurethane. At the completion of cleaning work the project standard shall be recleaned and painted in accordance with this specification. If in the opinion of the Engineer the project standard becomes deteriorated, or otherwise ineffective, it shall be re-established in accordance with this specification at no additional cost to the State.

The surface of the area blast cleaned in any one day shall be no greater than the surface area of steel that can be prime coated in the same working day.

All equipment and compressors used in the cleaning operation shall be equipped with all necessary filters and traps to prevent moisture, oil, and other contaminants from being deposited on clean surfaces.

To remove heavy deposits of rust and scale, hand pounding using a hammer, or power tool cleaning using a needle gun or de-scaler may be necessary before abrasive blast cleaning work begins.

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All fin, tears, slivers, burred and sharp edges that are present or occur during the blasting operation shall be removed by grinding, and then the area shall be reblasted to provide the required 40 μm to 65 μm deep anchor profile.

Throughout abrasive blast cleaning work, care shall be taken to protect newly painted surfaces from the cleaning operations. Tarps, covers, or other devices approved by the Engineer shall be used to protect new paint from damage. Damaged paint shall be thoroughly wire brushed or if visible damage occurs, reblasted to the required condition, and then repainted. All repair to damaged paint surfaces shall be approved by the Engineer.

After cleaning operations are completed, all residue generated by the cleaning work shall be removed by vacuuming using HEPA filtered vacuums. A HEPA filter shall be defined as a filter that is at least 99.97% efficient for particles that are 0.3 μm in diameter, or larger.

2. **Painting.**

Previously Painted Railing

Painting shall consist of applying three full coats of new paint to all steel railing surfaces that have been prepared by abrasive blasting to SSPC SP-10 or otherwise designated to be painted. The first coat shall be of primer, followed by application of a full coat of intermediate paint, and a full coat of finish paint, to all steel surfaces designated to be painted.

Weathered Galvanized Railing (Not Previously Painted)

Painting shall consist of applying four full coats of new paint to all steel railing surfaces that have been prepared by pressure-washing. The first coat shall be of primer, followed by a second coat of primer tinted for contrast as recommended by the paint manufacturer. The third coat shall be of intermediate paint, and a full coat of finish paint.

The following applies to all painting except b.2 which is only for *Previously Painted Railing* that will be abrasive blasted.

- a. **Material Storage.** Paint in storage shall be protected from damage and maintained between 4.5°C and 29.5°C.

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b. Specifications and Inspection Equipment. Prior to the start of and throughout the duration of work the Contractor shall supply the Engineer with the following specifications and equipment. *No work shall begin until these materials have been delivered to, and accepted by the Engineer.*

1. One bound copy of the Steel Structures Painting Council surface preparation specification, SSPC-SP 1 - Solvent Cleaning.
2. One bound copy of the Steel Structures Painting Council Surface preparation specification, SSPC SP-10 - Near White Blast Cleaning
3. One bound copy of the Steel Structures Painting Council method SSPC-PA2, Paint Application Specification No. 2 - Measurement of Dry Film Thickness With Magnetic Gages.
4. One Air Thermometer, pocket type, -10°C to +40°C.
5. One Surface Thermometer, -10°C to +40°C.
6. One Magnetic Dry Film Thickness Gage, Type 2 (fixed probe), with a digital readout display capable of measuring 1 μm to 1500 μm in 1 μm increments.
7. Two Wet Film Thickness Gages, Prong Type, capable of measuring 25 μm to 125 μm in 25 μm increments.

c. Atmospheric Conditions.

(Previously Painted Railing – Paints For Structural Steel NYS Approved List or NEPCOAT Paint System)

No paint shall be applied when the receiving surface and ambient temperatures are less than 5°C or greater than 38°C. Paint shall not be applied when the relative humidity is more than 85% and the temperature is within 5 degrees from the dewpoint. No paint shall be applied unless the receiving surface is absolutely dry. If the manufacturer's recommendations are more restrictive then that criteria should be observed.

(Weathered, Galvanized Railing – Paints for Structural Steel – Moisture Cured Urethanes NYS Approved List):

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No paint shall be applied when the receiving surface and ambient temperatures are less than 1.5°C or greater than 38°C. Paint shall not be applied when the relative humidity is more than 95% unless the coating manufacturer's requirements are more stringent.

No paint shall be applied during rain regardless if painting occurs within a containment.

In general, no paint shall be applied in the months of December, January, February, or March. If the Contractor requests approval to apply paint in winter months, and if in the Engineer's opinion satisfactory results can be achieved, then the substrate shall be enclosed, painted under cover, and protected from the surrounding air. The interior of the enclosure shall be heated and the steel painted when the surface temperature is 10°C or greater. Direct application of heat to the steel surface will not be allowed. The painted steel shall remain enclosed and heated for a minimum of eight hours, or until the applied coating is dry, whichever is longer. No additional payment will be made for the cost of enclosing, heating and protecting paint that has been applied in conditions of cool weather.

When painting inside an enclosure adequate mechanical ventilation shall be supplied to meet OSHA regulations for worker exposure to solvents, fumes, lead and other provisions. When mechanical ventilation is provided, filtration of the exit air will not be required. No additional payment will be made for the cost of ventilation.

- d. Mixing Paint. All paint shall be THOROUGHLY mixed with mechanical mixers in accordance with the manufacturer's recommendations. After mixing the bottom of the container shall have no unmixed pigment. Mixing should occur periodically during painting to prevent settling of pigments.
- e. Solvents and Thinners. Paint may be thinned only if approved by the Engineer. Only approved thinner shall be used as per the paint data sheet or consultation with paint manufacturer. Use of unauthorized solvents and thinners, or using excess amounts of solvents and thinners is prohibited. Any area where unauthorized solvents or thinners or excessive amounts of solvents or thinners are used will result in the Contractor restoring the surface to its initial condition at no expense to the State.

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The paints specified for this work have a limited pot life because of their reaction with the moisture in the atmosphere. The paint will gel when it nears the end of its pot life. Thinning to reduce the viscosity of gelled paint will not be allowed. The pot life of this paint can be extended by covering open containers to reduce exposure to moisture, and by keeping containers of paint cool.

- f. Paint Application. No painting shall begin until cleaned surfaces have been inspected and approved by the Engineer.

Paint may be applied using brush, roller or spray methods, unless spray painting is prohibited by the Contract Documents. When spray painting is prohibited, paint shall be applied using brushes or rollers only. All paint shall be applied so as to produce a uniform, even coating free of runs, sags, drips, ridges or other defects. Roller covers used shall be of a quality and make that eliminates or minimizes the occurrence of nap fibers in the paint film and shall be appropriate for use with paints containing strong solvents. Excessive roller nap in the paint film will not be acceptable and will require removal of the paint film to bare metal.

Complete protection against paint spatter, spillage, overspray, wind blown paint, or similar releases of paint shall be provided. Covers, tarps, mesh, and similar materials shall be placed around the work area to protect public and private property, pedestrian, vehicular, marine or other traffic, all portions of the bridge, highway appurtenances, waterways, and similar surrounding areas and property, upon, beneath, or adjacent to the structure.

- g. Paint Film Thickness. Paint shall be applied in such a quantity so as to produce the minimum specified dry film thickness as per the manufacturer's product data sheet.

The dry film thickness shall be determined in accordance with SSPC-PA 2, Paint Application Specification No. 2 - Measurement of Dry Film Thickness with Magnetic Gages, using a Type 2 fixed probe magnetic gages, equipped with a digital readout display.

Areas failing to meet the specified minimum dry film thickness shall be overcoated with the same type of paint to produce at least the total dry film thickness required. If the time elapsed between coats exceeds the recoat window established by the manufacturer, the original paint must be sanded or brush blasted as per SSPC SP-7 to establish mechanical bonding.

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- h. Painting Schedule. Primer shall be applied to cleaned railing surfaces within twelve hours of the cleaning operation. Subsequent coats of paint shall be applied after all surfaces of the railing have had sufficient time to dry but no sooner than the time to recoat as stated in the manufacturer's product data sheets for the given temperature.

To prevent intercoat adhesion failure, recoating with the next coat of primer, intermediate, and finish paint, must be performed within the maximum specified time period, or 14 days, whichever is shorter. If the Contractor fails to recoat within the specified time period the surface to be painted shall be completely brush blasted to SSPC SP-7 or roughened by sanding as ordered by the Engineer, solvent cleaned as per SSPC SP-1, and repainted in accordance with this specification, at no expense to the State.

METHOD OF MEASUREMENT

This work will be measured on a lump sum basis.

BASIS OF PAYMENT

The lump sum price bid shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work. The cost of providing protection against damage during pressure washing and paint application shall be included in the bid price. Progress payments will be made based on the percentage of the structure's railing cleaned and painted in accordance with this specification.

Payment will be made under:

Item No.	Item	Pay Unit
573.1017nn11 M	Field Cleaning and Painting of Steel Bridge Railing (weathered galvanized – not previously painted)	Lump Sum (for each structure)
573.1018nn11 M	Field Cleaning and Painting of Steel Bridge Railing (previously painted)	Lump Sum (for each structure)

Note: nn denotes serialized pay item. See §101-02 Definition of Terms under “Specifications”.